JAN 13 2015 6

SEQUENCE LISTING 10> LESSARD, PHILLIP A. SINSKEY, ANTHONY J. <120> NOVEL COMPOSITIONS AND METHODS FOR GENETIC MANIPULATION OF RHODOCOCCUS BACTERIA <130> MTV-076.01 <140> 10/820,451 <141> 2004-04-07 <160> 21 <170> PatentIn Ver. 3.2 <210> 1 <211> 4970 <212> DNA <213> Rhodococcus sp. <400> 1 gaggaacgtc gggcggtcga gcgcggcgtc gtcgcgtgtg gagttgcgcg agcgggtggt 60 cgaggtcgag aaggtggtgc atcggccggc cacgacggcc gcgtccatcg accgcgtact 120 cgacgacgat caggcgctgc agaagctgtt gaacacgctg cggcaccgca tcaaggaagg 180 cacctaccgg cccggcggtg acaggaacat gacgtgggtg ctccggaggc tcacggcccc 240 ggtggccgat ctgctcgccc agatccactc gagtgcaggc accaccgcgt acatcgaccc 300 ggcgcaggcc gtgcaggcag tgctcggctc accacgctcg tgccgcgcgg tcctggaagg 360 cetegacaca atggeeeget eeggagaget egacggegge eagcacaceg ceacactgae 420 agecetegae eggetegtag eteacaceeg geageagage egatagaaaa eggagetgee 480 geggeacege tgegegetge ettgecaceg aaacgatgte cettaegacg gggacegagg 540 gagtgaccgc atgagtcttg atcagcagat agccgagctg cgcgagcagt tgaacgccct 600 cggccgccag gtgcgcgagg tgacagaggc cgccgacgag caggacaagc ccgacgtcgt 660 cgacgccctg gccgacgtgc gcatgcacct caacgacgcc gccgccgtcc tcggggacgt 720 gatcgcatga gcgactggac gagctgggtc tgtcccaggt caccgaccca gcaacacgtc 780 cccgctggcc taccgccacg tcacgcccag gtgagggaca ctgacccacg tgaccaaccc 840 agggcagacg ttcaccgtga ccacggccgc caaggcgtgc caggtgtcgc ggaagacgat 900 cactegacge cttgaccage tgcgagacgg cggcgcgtac aaggatgcgg ccggcgcgtg 960 ggtgatcccg cttggttcgc tcctccacgc cggtctcagt ccgggtaggc cagcgtcccc 1020 ggatgctgtc cacgtgtccc aggaggacac acagggacag gaggacagag gctggttcac 1080 cctcgagcaa gtcgcggaat tgcgtaagcg cgccgacgag gcggagtcac ttcgccggcg 1140 ggccgaggtc gcggaagccc tggccacaga gcgggaaaga gtgatcgagg tgcaggcgcg 1200 cgccctgcgg atgctcgagg ccggccaacg gccgaccgcg caccaggaaa cgacgtcaga 1260 ggtttccgcc acgccggccg atgtgccgcc acgccgcggt ccgctagaac gcctggtcgg 1320 acggttcggg ctgtagcgtt tggcaaggtc aagccagcgc cgaccggggc aattggtaga 1380 gcaagtgact cttaatcact gggtcatatg gcgagaccca tggcgattat ctgggaggaa 1440 gacgcggtcg gggacttctg tttcagcgcc gtcgaagtgc ctctgggatg ggttgtttgt 1500 ggaccgtagt cagctggtcg aaggctgcgc cacagacggg gcaaaagcct ttgatgcgcg 1560 cgtggccgcc gacctcgaca tccgttggcc caccgagcca ttgctcgttt gaacaggtct 1620 cacagaccat cagggtegeg cgtgcaacgc accegcacgg cagggetgtc ccaaggggga 1680 cgggctggta gtggacgtca tcgcagctga tactcatcgc tcgattcctg ccagggcgtg 1740 atggacagtg ccgaccgagc atcccagctc attggcgata gctctcatgg acatgccagt 1800

accgcgtage tecegtatet tetegegeeg ttgetgtgee egggacaggt aggeeteteg 1860 eggetetgat gtecacegga tgatgetgge egtegataeg cetgtgegtt eggegagete 1920 eegeactgtt atccegttge gaggeagaeg etcagteatg tgtggeetee teaattgeea 1980 gtegeacetg atccagtttg gtgetgegtg eacgeeggge etggeegetg gegacgeege 2040 etttgeggee aegggegat tggatggteg agagtgtgge ttegtagaeg gegataeegt 2100

```
ctttccagat gcgggatcgc gtggtgatcc atcggtgaat gctggcggcg atggcgcggg 2160
cttcagaggg tgggagttcc tcggtgtagc tggcgttgag ggcggtgact tcgcggtgga 2220
gggcgagttc gaggccggcg ctgtcatgag tgggcaggta gttgcgcatg aggccggggc 2280
gggtggccca ggtgcgagcg gcgtggaaga ttgcgcagtt gcggccgagt cctatggggg 2340
cgtcacggtg ggccttggtg tgctgccagc gcggggaggg catgtgtgtg ccgagttcgg 2400
cctcgagctc ggcgaggctg cgcggttcgg tgtggatcca gtgcgtgtcc cagcctgagt 2460
gtgtggggtt cttggtcatc aggcctgagt agccgatgtc cccttcgacg gcccggcgta 2520
gcccttcggt aacggcggcg gcgtacgcga ggggcttccg tcgggcgtac tcggtgcggg 2580
tgaacggctc gcgcagccac cagtgcaggt gcgcatgccc gttgctgctg ttttcgatca 2640
cggcgttcgg catagggtga ttgcctgccg ctgacagtgc gcgcagggcg gagtcggggt 2700
ggtcgacgtc gacgacgagc agattgctca gtgtctgcgg gttggcctcg atgtagcgcc 2760
gctcaagtgc ggcagggcgg cgcattcgat agaccccctc aaggaagtcg tttgttgcca 2820
aaggccagaa cggtagccac atttgctccc agtccccacc ttcccgcacc ccgtgtgtgt 2880
ccatgctggt gaccgtcgca tgctctcgaa cgaaacctgg gcatttccct cggtgtgttc 2940
aaagttaate gtgaageeaa gteagatgtt teggtgtege eaggegeeee teggtgttgtt 3000
caaagttaat cgtgaagcca agtcagatgt ttcggtacgc ccctggggaa accccttcaa 3060
gtccggcact cccaatgcct catcgtgcgc atgcaggttt gaaacggccg gcggcttaat 3120
ttcgtcgcgc gaaaacctct ccacggtctc tgaagttcag caagaggtgt gcctgaattt 3180
cagtgcgccc ggactcgcaa cgaagtgccc gcttgctgat ttgtcggcga ctcagtcggt 3240
gccatgtacg gacgcgtgac gtttcaccac ggtgcgggcg agatcagcga tcttgacgtt 3300
catgttctgt gaggttcgcc tgagaatgtc gaaggcgtcc tcagacgaca cgtcgtgcag 3360
tgccatcagc agaccgatcg cettaccgat etegegattg etetecagec egegeegeag 3420
ggtgactgcc tcttctcccc aggtgatggc agccaccgtc acggctgcga atgacgcgag 3480
cacggcagcg ggtcctgcgg cctcagtcgt gaacgccccc ggagtgtcac tgaagagatt 3540
cagtgctcca actttgtggc cgtcgacgag cagacgaaat cccatgacgc cacgaaccgg 3600
agtttgtgcg agcacctggc gcgccagccg cggccagccg gtgggtgtgg cgaggtcggg 3660
ategagttgt geggetteet cetetatege gtegaggeae ggteeeteee eggtetggeg 3720
ctcgagatcg tctaccagcc gcgcgatgtc gtccgatgcg gccaccgtca cgggtaaatc 3780
ccggccacgc aacatcaggc ttgcgtggtc acagccggga accagcaggg tggcggac 3840
acagaccgcc gcgtaaacct cggacggctc ggaaccgttg tagacaatgt cggcgagcgc 3900
ggcgaatacg gtccccggat ccgacttgct gggggtagct gcgctctgcg cgtccgtcat 3960
gacgttcctg ctttcaagcc cctctgggct gcgtcaaacg ctacgcggtg gaactgctcg 4020
ggagtcatcc cagatggtgg agtgaaaggc gtgcgtttgg catcggccga ggcccgataa 4080
ccgtcgtccg cgcggccgca gagcgctgag caagataggc acttacctca cgtaagtgag 4140
gagtgatggg tgcgcgagcg atcgcgcacc ggagacaccg ggtgaaggct gggtccggta 4200
gcgcagggac agcacgcggc gcagcctgac tcgctacctt gctgactcgc taccttgctg 4260
actegetace ttgetgacte getacettge tgactegeta cetacgegge geageaagat 4320
ggagacttag gtgccctaag tcgcagccg cattcgcggg atccctgtcg gggcgctgcg 4380
ctgggcggtg aaataccaac cttgcggttc ctgggaacag ctaaaccgaa cggtgtcgct 4440
teggeagteg gggatgaega egecaggtge getggggget acaaaggaac gagatgeteg 4500
ctggtgttac cgaggtggtg tgccaacgag aatccaactt gccgcagcgt ttggtgtttt 4560
tgggggggaa gcggatctcc cgatgagggg cactgccacg cacactgagg ggcgatccgc 4620
atgggtgttt cacgggcacg gtcacttgcg tactgggagc agcacgtctg gatcgaaacg 4680
cacgaccaca tateceeggg eeggtaccaa gtgeeggeeg agaaaegtge ateteeegeg 4740
gacaccgtgt cggcacctga gaaccaagcc gagtaattcc acgacgcaac agatccagat 4800
ccgacacacc tcttgcactc aggagtgaat gtcggggcat tttcgcgcga cgaaattagg 4860
ategeggeta tgaegaegee gegatgeeee egetgtgaee gegagatega gageaacaee 4920
agegeactge aeggtegegg eeggeegegg aagtggtget eggaegagtg
                                                                  4970
```

```
<210> 2
<211> 1341
<212> DNA
```

<213> Rhodococcus sp.

<400> 2

cgtcatcgca gctgatactc atcgctcgat tcctgccagg gcgtgatgga cagtgccgac 60 cgagcatccc agctcattgg cgatagctct catggacatg ccagtaccgc gtagctcccg 120

```
tatetteteg egeegttget gtgeeeggga eaggtaggee tetegegget etgatgteea 180
ceggatgatg etggeegteg atacgeetgt gegtteggeg ageteeegea etgttateee 240
gttgcgaggc agacgctcag tcatgtgtgg cctcctcaat tgccagtcgc acctgatcca 300
gtttggtgct gcgtgcacgc cgggcctggc cgctggcgac gccgcctttg cggccacggg 360
cggattggat ggtcgagagt gtggcttcgt agacggcgat accgtctttc cagatgcggg 420
ategegtggt gatecategg tgaatgetgg eggegatgge gegggettea gagggtggga 480
gttcctcggt gtagctggcg ttgagggcgg tgacttcgcg gtggagggcg agttcgaggc 540
eggegetgte atgagtggge aggtagttge geatgaggee ggggegggtg geeeaggtge 600
gageggegtg gaagattgeg cagttgegge cgagtcctat gggggegtca cggtgggect 660
tggtgtgctg ccagcgcggg gagggcatgt gtgtgccgag ttcggcctcg agctcggcga 720
ggctgcgcgg ttcggtgtgg atccagtgcg tgtcccagcc tgagtgtgtg gggttcttgg 780
tcatcaggcc tgagtagccg atgtcccctt cgacggcccg gcgtagccct tcggtaacgg 840
cggcggcgta cgcgagggc ttccgtcggg cgtactcggt gcgggtgaac ggctcgcgca 900
gccaccagtg caggtgcgca tgcccgttgc tgctgttttc gatcacggcg ttcggcatag 960
ggtgattgcc tgccgctgac agtgcgcgca gggcggagtc ggggtggtcg acgtcgacga 1020
cgagcagatt gctcagtgtc tgcgggttgg cctcgatgta gcgccgctca agtgcggcag 1080
ggcggcgcat tcgatagacc ccctcaagga agtcgtttgt tgccaaaggc cagaacggta 1140
gccacatttg ctcccagtcc ccaccttccc gcaccccgtg tgtgtccatg ctggtgaccg 1200
tegeatgete tegaacgaaa eetgggeatt teeeteggtg tgtteaaagt taategtgaa 1260
gccaagtcag atgtttcggt gtcgccaggc gcccctcggt gtgttcaaag ttaatcgtga 1320
agccaagtca gatgtttcgg t
<210> 3
<211> 744
<212> DNA
<213> Rhodococcus sp.
<400> 3
ctcgagatcg tctaccagcc gcgcgatgtc gtccgatgcg gccaccgtca cgggtaaatc 60
ceggecaege aacateagge ttgegtggte acageeggga accageaggg tggeggegae 120
acagaccgcc gcgtaaacct cggacggctc ggaaccgttg tagacaatgt cggcgagcgc 180
ggcgaatacg gtccccggat ccgacttgct gggggtagct gcgctctgcg cgtccqtcat 240
gacgttcctg ctttcaagcc cctctgggct gcgtcaaacg ctacgcggtg gaactgctcg 300
ggagtcatcc cagatggtgg agtgaaaggc gtgcgtttgg catcggccga ggcccgataa 360
ccgtcgtccg cgcggccgca gagcgctgag caagataggc acttacctca cgtaagtgag 420
gagtgatggg tgcgcgagcg atcgcgcacc ggagacaccg ggtgaaggct gggtccggta 480
gegeagggae ageaegegge geageetgae tegetaeett getgaetege taeettgetg 540
actogotaco tigotgacto gotacotigo igactogota cotacgoggo goagoaagat 600
ggagacttag gtgccctaag tegcageeeg cattegeggg atecetgteg gggegetgeg 660
ctgggcggtg aaataccaac cttgcggttc ctgggaacag ctaaaccgaa cggtgtcgct 720
tcggcagtcg gggatgacga cgcc
<210> 4
<211> 91
<212> DNA
<213> Rhodococcus sp.
<400> 4
ggcgcctggc gacaccgaaa catctgactt ggcttcacga ttaactttga acacaccgag 60
ggaaatgccc aggtttcgtt cgagagcatg c
<210> 5
<211> 933
<212> DNA
<213> Rhodococcus sp.
```

```
<400> 5
atggacacac acggggtgcg ggaaggtggg gactgggagc aaatgtggct accgttctgg 60
cetttggcaa caaacgactt cettgagggg gtctatcgaa tgcgccgccc tgccgcactt 120
gageggeget acategagge caaceegcag acategagea atetgetegt egtegaegte 180
gaccaccccg actccgccct gcgcgcactg tcagcggcag gcaatcaccc tatgccgaac 240
gccgtgatcg aaaacagcag caacgggcat gcgcacctgc actggtggct gcgcgagccg 300
ttcaccegca cegagtacge cegaeggaag cecetegegt aegeegeege egttacegaa 360
gggctacgcc gggccgtcga aggggacatc ggctactcag gcctgatgac caagaacccc 420
acacactcag gctgggacac gcactggatc cacaccgaac cgcgcagcct cgccgagctc 480
gaggeegaac teggeacaca catgeeetee eegegetgge ageacaceaa ggeecacegt 540
gacgccccca taggactcgg ccgcaactgc gcaatcttcc acgccgctcg cacctgggcc 600
accegeceeg geeteatgeg caactacetg eccaeteatg acagegeegg cetegaacte 660
gccctccacc gcgaagtcac cgccctcaac gccagctaca ccgaggaact cccaccctct 720
gaageeegeg ceategeege cageatteae egatggatea ceaegegate eegeatetgg 780
aaagacggta tegeegteta egaageeaca etetegacea tecaateege eegtggeege 840
aaaggcggcg tegecagegg ccaggecegg cgtgcacgca gcaccaaact ggatcaggtg 900
cgactggcaa ttgaggaggc cacacatgac tga
<210> 6
<211> 246
<212> DNA
<213> Rhodococcus sp.
<400> 6
atgactgage gtetgeeteg caaegggata acagtgeggg agetegeega aegeaeagge 60
gtatcgacgg ccagcatcat ccggtggaca tcagagccgc gagaggccta cctgtcccgg 120
gcacagcaac ggcgcgagaa gatacgggag ctacgcggta ctggcatgtc catgagagct 180
ategecaatg agetgggatg eteggtegge aetgteeate aegecetgge aggaategag 240
cgatga
<210> 7
<211> 78
<212> DNA
<213> Rhodococcus sp.
<400> 7
ctgactcgct accttgctga ctcgctacct tgctgactcg ctaccttgct gactcgctac 60
cttgctgact cgctacct
<210> 8
<211> 110
<212> DNA
<213> Rhodococcus sp.
<400> 8
ccctcggtgt gttcaaagtt aatcgtgaag ccaagtcaga tgtttcggtg tcgccaggcg 60
cccctcggtg tgttcaaagt taatcgtgaa gccaagtcag atgtttcggt
<210> 9
<211> 27
<212> DNA
<213> Artificial Sequence
```

```
<220>
<223> Description of Artificial Sequence: Synthetic
      primer
<400> 9
ggaattcgct gtcatgagtg ggcaggt
                                                                    27
<210> 10
<211> 30
<212> DNA
<213> Artificial Sequence
<223> Description of Artificial Sequence: Synthetic
      primer
<400> 10
cctgcagaaa tgcccaggtt tcgttcgaga
                                                                    30
<210> 11
<211> 20
<212> DNA
<213> Artificial Sequence
<220>
<223> Description of Artificial Sequence: Synthetic
      primer
<400> 11
cacacctaaa ctgacatgct
                                                                    20
<210> 12
<211> 18
<212> DNA
<213> Artificial Sequence
<220>
<223> Description of Artificial Sequence: Synthetic
<400> 12
gcaatatggt cttcgcct
                                                                    18
<210> 13
<211> 20
<212> DNA
<213> Artificial Sequence
<220>
<223> Description of Artificial Sequence: Synthetic
      primer
<400> 13
cgagatcgag agcaacacca
                                                                    20
```

```
<210> 14
<211> 19
<212> DNA
<213> Artificial Sequence
<220>
<223> Description of Artificial Sequence: Synthetic
      primer
<400> 14
cgttgtaaaa cgacggcca
                                                                    19
<210> 15
<211> 36
<212> DNA
<213> Artificial Sequence
<220>
<223> Description of Artificial Sequence: Synthetic
<400> 15
aaaaaacata tgagcacatc gacgtcgacg acgacc
                                                                    36
<210> 16
<211> 35
<212> DNA
<213> Artificial Sequence
<220>
<223> Description of Artificial Sequence: Synthetic
      primer
<400> 16
aaaaggatcc tcagccggcg agggtgagcc ggccg
                                                                    35
<210> 17
<211> 20
<212> DNA
<213> Artificial Sequence
<223> Description of Artificial Sequence: Synthetic
      primer
<400> 17
gcaaggcgat taagttgggt
                                                                    20
<210> 18
<211> 22
<212> DNA
<213> Artificial Sequence
```

<220>					
	Description of primer	Artificial	Sequence:	Synthetic	
<400>	18				
cgaaga	ccat attgctcacc	ga			22
<210>	19				
<211>	20				
<212>					
<213>	Artificial Sequ	ence			
<220>					
	Description of .	Artificial	Sequence:	Synthetic	
	primer				
<400>	1.0				
	gaag atcatctcgt				20
ggaccc	gaag accaeeeege				20
<210>	-				
<211>			•		
<212>					
<213>	Artificial Sequ	ence			
<220>					
<223>	Description of .	Artificial	Sequence:	Synthetic	
	primer				
<400>	20				
	ggtt gaactgggt				19
_	33 3 333				
.010	21				
<210> <211>					
<212>					
	Artificial Sequ	ence			
	-				
<220>			_		
	Description of <i>I</i> primer	Artificial	Sequence:	Synthetic	
	brimer				
<400>	21				
ggagaa	gatc gtcgatgtcg	t			21